PART 1

PROJECTDETAILS

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PART 1
PROJECTDETAILS

1.1 Background to the Project

To treat sewage generated and collected within the BBMP areas, BWSSB is proactive in planning and implementing the Up-gradation of existing Sewage Treatment Plants (STPs) and construction of new Sewage treatment plants as some of the existing STP'S are not designed to remove Biological Nutrients and treat the effluents to meet the standards specified by CPCB and NGT. To take forward this initiative, BWSSB has initiated the process of preparation of Tender document for construction of New Sewage Treatment Plants and Up-gradation of existing Sewage Treatment Plants, with suitable sewage treatment technology to remove biological nutrients along with PMC services.

1.2 General Description of Project Area

Project area is located in the core area. The location of project area which includes Comprehensive map of Sewerage System of Bangalore with the jurisdiction of Hebbal STP Division is shown in Figure 1.1. The existing project area Rajacanal Phase-I is located at the Hennur main road, Geddalahalli near Amani Byrtahikere village. The total land available in the Raja Canal STP premises is about 22 acres, out of which Phase-I plant occupied an area of about 9.6acres.The treated effluent from the plant is collected in treated sewage outfall chamber from where the Minor irrigation department is tapping and pumping to Chikkaballapura.

BWSSB has constructed 40 MLD capacity STP based on Extended Aeration technology process with Biological Nutrient removal at Rajacanal under CWSS Stage IV Phase I to treat additional flows received at Raja canal catchment area. The TSPS of capacity 40MLD has been constructed within Raja Canal STP premises to pump sewage of 40MLD to inlet of Rajacanal STP Phase-I. Under CWSS Stage IV Phase I Project and the plant was commissioned during the year 2004.

The Project also includes PLC-SCADA system and all other works contingent thereto including design, construction, civil works, supply of mechanical, electrical, interconnecting piping and instrumentation equipment's, erection testing and commissioning.

The Google Map showing the location of existing Phase-I 40MLD capacity STP with TSPS along with Phase-II 40MLD capacity STP within the same premises with outlet from CCT to nearby drain is indicated in Figure 1.2 is as presented below.

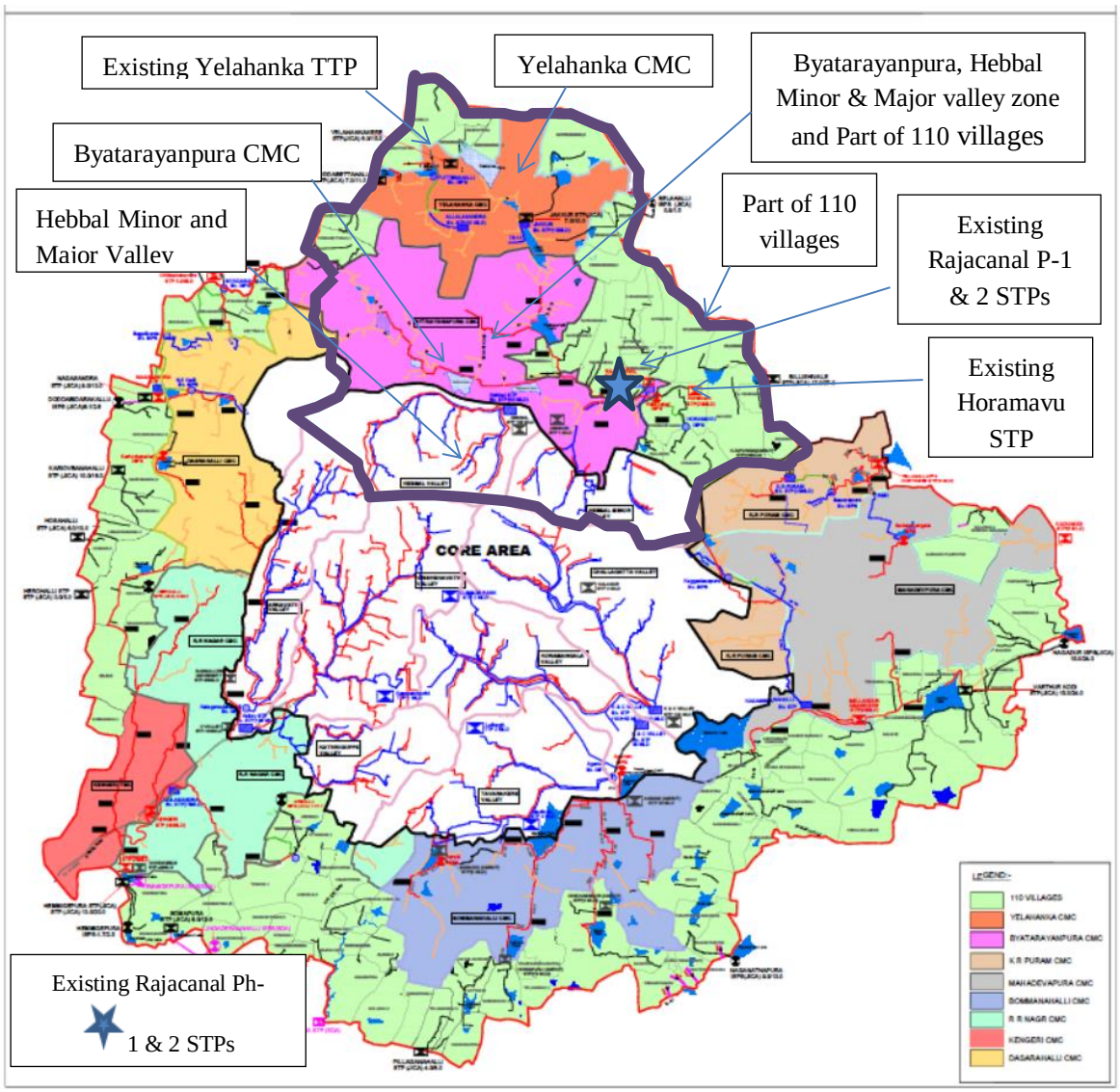
Existing Yelahanka TTP
Yelahanka CMC
Byatarayanpura, Hebbal Minor & Major valley zone and Part of 110 villages
Byatarayanpura CMC
Hebbal Minor and Maior Vallev
Part of 110 villages
Existing Rajacanal P-1 & 2 STPs
Existing Horamavu STP
CORE AREA
Existing Rajacanal Ph-
1 & 2 STPs

Figure 1.1: **Location of Project Area which includes Comprehensive map of Sewerage System of Bangalore with the jurisdiction of Hebbal STP Division.**

New 40MLD STP at Rajacanal
Old 40MLD STP Rajacanal
40MLD TSPS to old STP
20/40-ISPS/TSPS to Horamavu and Rajacanal new STP
Outlet from old STP to drain
Google Earth
200 m
N

Figure 1.2: **Goggle image of 40MLD Phase-I & Phase-II STPs and ISPS and TSPS at Rajacanal**

Figure 1.3: **Goggle image showing the proposed modification and new units under Up-gradation**

1.3 Description of the work

1) The Sewage Treatment Plant at Rajacanal Phase-I at Hennur main road, shall comprise the following components:

(a) Components and unit processes as described in Volume 2, Section 7, Part 5 (Process Requirements) of these tender documents

(b) All functional buildings, structures, equipment, and any and all other items, accessories, and ancillaries required for proper functioning and operation of the above components and unit processes.

(c) Civil and Building Works for

- Structures for afore mentioned processes
- Inlet structure for PTU
- New head works with Vortex type Grit removal system
- New Alum dosing unit
- New Disc cloth filter unit
- Enhancing of Chlorinators capacity
- New Centrifuge building
- Roadways, Curbs, Pavements, Parking Spaces, and associated drainage

(d) Complete Electrical Equipment and Systems

(e) Complete Mechanical Equipment and Systems

(f) Complete Instrumentation, Control, and Automation Equipment and Systems

(g) Civil, Mechanical, Electrical, and Instrumentation, Control, and Automation Erection, Installation, Testing, and Commissioning Services

1.4 Scope of Work for STP

The Scope of Work under this contract includes but is not limited to the following in relation to the design, Build (construction), operation, and maintenance of the Works, which are to be implemented.

All preparatory work including clearing and levelling of site, site grading, formation of Finished Ground Level (FGL), construction of internal roads, all around compound wall etc., excavation, dewatering as required and disposal of all surplus earth and debris from the demolition work to a suitable location by the Contractor at his own cost.

- Site Topographical survey and geotechnical investigation and any other investigation as deemed by the contract conditions.
- Site Clearing, Excavation, Leveling, Grading and Backfilling Activities
- Setting out of the works.
- Preparation of process and hydraulic designs with layout, process flow diagram, piping and instrumentation diagram and mass balance and Hydraulic flow diagram of the complete STP as stipulated in scope for existing units and proposed units.
- Laying of new DI pumping main from existing 20 MLD (ISPS) to the inlet of Raja Canal Phase-1 STP with required capacity pumps and pipelines arrangements as per the directions of the engineer-in-charge.
- Providing and Fixing 2nos of Trash Rack Screen Manual with all lifting arrangement with Electrical hoist inside Distribution Chamber – 2 as per the directions of Engineer in charge.
- Diversion of Inlet sewage from Jackwell chamber to phase-2 Coarse Screen Chamber with required capacity pumps and pipeline arrangements as per the directions of engineer in charge for installation of Trash Rack Screen.
- Construction of Compound Wall at the periphery of BWSSB Premises as per the directions of Engineer-In-charge
- Dismantling and demolition of Existing Primary Treatment Unit of STP and Construction of new primary treatment unit - inlet structure with vortex type grit removal system.
- Dismantling and stacking of existing piping, reinforcement steel and equipment's safely and hand over the released materials and equipment in good condition after weighing along with list to Engineer- in charge, BWSSB.
- Cleaning of Anoxic Tank with necessary pumping arrangement in complete in order to construct a partition wall inside aeration tank.

- Construction of a partition wall in the aeration tank.
- Re-routing of existing internal recycle pipeline from inlet of existing anoxic tank to the downstream of the anoxic tank to convert the anoxic tank into anaerobic tank
- Design and construction of new Disc cloth filter unit, Centrifuge unit, Alum building and other units necessary to complete the project successfully.
- Replacement of surface aerators with aspirating type of Float mount aerators along with Air Blowers of minimum capacity mentioned in the tender document.
- To avoid necessity of a sludge drying bed and manual sludge loading, Sludge Thickener, Centrifuge system should be installed with all its accessories.
- Alum Dosing system shall be provided for the treatment process.
- Mechanical raked fine screens in PTU, Manual Trash racks inside DC-2 chamber, belt conveyors along with all its accessories and allied civil works should be provided.
- Columns and platform area of the Aeration tank are severely damaged. Therefore, the aeration tank should be refurbished after strengthening the RCC structure.
- All civil structure units to be tested with sufficient number of rebound hammer test and necessary strengthening of civil work to be carried out as per the directions of Engineer in charge.
- Dismantling and demolition of existing of sludge drying beds and leveling to FGL.
- Necessary arrangement / provision to be made as such, Plant shall be kept in running condition at all times during replacement of electromechanical equipment's and any other works.
- Existing TSPS to be in running condition until the construction of the new 80 MLD ISPS at Rajacanal.
- All Hand rails to be replaced with New Handrails as per the specification mentioned in the part 10B
- A SCADA system should be installed for continuous monitoring and management of all electro-mechanical equipment including all Electrical related works.
- Minimum 2 nos. of air conditioner of 2 tonnes capacity shall be provided in SCADA room.
- Preparation of GA Drawings, Unit Process/Equipment/Facility/Building layouts, etc. complete for proposed Disc cloth Filter unit
- Submission of Detailed engineering designs, drawings, calculations, and data sheets as per requirements of Bidding.
- Complete Instrumentation, Control, and Automation Equipment and Systems (SCADA) with necessary cabling

- Replacement of complete electromechanical and ICA system
- Preparation of process and hydraulic designs with layout, process flow diagram, piping and instrumentation diagram, mass balance and hydraulic flow diagram of the complete STP as stipulated in scope for existing units and proposed units.
- Existing road and roadside drains shall be restored completely to original condition as per the directions of engineer in charge
- No part of the work will be in Employers scope, all the works shall be in scope of the Bidder.
- Dismantling and demolition of existing sludge drying beds including leveling and rerouting of sludge line to proposed sludge handling system.
- Plant testing, commissioning, stabilization, demonstration of performance guarantee
- Submission of Operation and Maintenance Manuals.
- Providing training services to Employer's personnel including O&M staff.
- Complete plantation and landscaping works to give pleasant and Aesthetic environment of build out campus to be made as per the directions of Engineer in charge
- Admin Building – Providing and fixing Granite in complete G+2F.
- Painting of all Civil Units and Electromechanical Equipment's to be carried out in complete as per the directions of Engineer in-charge
- All civil units Windows and Doors to be replaced with New as per the specification in Contract conditions.
- Centrifuge Building (G+1F) to be constructed with provision for disposal of Sludge.
- Alum storage building and dosing unit to be constructed.
- Cleaning of Existing CCT of 40 MLD STP - (i) Tank shall be emptied of water by pumping & bottom shall be cleaned of silt and other deposits. (ii) Entire surface area of the sump shall then scrubbed thoroughly with wire brush etc. and pressure washed with water. (iii) Chlorination of RCC internal surface by liquid chlorine. (iv) The treated surface shall be dried using air jetting and all loose particles shall be removal from the surface. (v) Finally, the surface shall be treated with ultraviolet radiation etc.(vi)Hacking of CC flooring including cleaning for surface etc. complete as per direction of the Engineer-in-Charge.
- Chlorine contact tanks shall be thoroughly cleaned, tiled, and painted with algae-resistant paint or coating, preferably in blue color.
- Preparation and submission of As-Built drawings for all civil, mechanical, electrical, Instrumentation, SCADA works complete.

- Real time online monitoring systems are installed recently, the contractor to integrate the same with SCADA system with necessary arrangement and spare parts as per Particular requirement of the contract.
- Auto sampler at both inlet and outlet and laboratory equipment's complete to be provided.
- Detailed sizing, design, and engineering, of all treatment units, buildings, structures, and equipment (including all civil, mechanical, electrical, architectural, instrumentation, control, automation, and SCADA components).
- PLC based SCADA system for fully automatic & safe operation of STP & TSPS.
- Wireless Communication System for remote monitoring of STP and TSPS from Central SCADA Station at Shimsha Bhavan / Cauvery Bhavan as well as wireless communication between STP & TSPS SCADA.
- Integration of details of 20 MLD ISPS from Phase-II and Newly constructing 80 MLD ISPS to the SCADA System of Rajacanal Phase-1 is contractor scope
- Auxiliary systems like CCTV monitoring of STP and TSPS with minimum 12 nos. with 360^0 rotation shall be provided.
- Getting required consent and clearances from KSPCB Authority to set up and operate the proposed plant. Charges to be borne by Contractor and same will be reimbursed by employer.
- Separate RMU and required accessories to be installed in STP to measure the power consumption separately at Rajacanal Phase-1
- Any Miscellaneous Works as per direction of the Engineer-in-Charge
- Tests on Completion, trial run and commissioning.
- Providing Training Services to Employer's Personnel
- No part of the work will be in Employers scope, all the works shall be in scope of the Bidder.
- Two Years of Operation and Maintenance during Construction Period in complete to be maintained by the contractor as per the conditions of Contract followed by
- Five (5) years Operation and Maintenance for STP in this Contract after successful passing of the Tests on Completion of Design-Build and Issue of the Commissioning Certificate as per the Conditions of Contract given in Volume1 of the Bidding Document.
- All Sludge/Grit/screening material/other waste material to be disposed by the contractor.
- Handing over the facilities after completion of 5 years of O&M with working condition

Notes:

1) *Contractor to submit Unit Process / Equipment / Facility / Building wise Construction Approach and Methodology, prior to start of each/any type of constructional activity at site.*

2) It shall be mandatory for Contractor to take prior approval on EMP and EMoP document based on the requirements as specified in Part 18 of the Tender Document.

1.5 Additional Scope for Civil Works

The scope of work for STP shall include all civil works as per process requirements, including other facilities as listed below.

General points to be noted and implemented for STP,

1. The bidder has to survey and study the condition of existing Civil, mechanical, electrical and ICA works to be retained or replaced in the proposed up-gradation work
2. Repairing, construction of civil structures after dismantling and fixing of electro mechanical works.
3. Painting of structures, handrails, tiles works wherever applicable including stairs, epoxy coating.
4. Construction of inlet chamber, screen channels, new disc cloth filter unit with pump house, Chlorination unit scrubber system, centrifuge building. Alum building
5. Necessary modification in the incoming pipeline alignment
6. Sludge storage yard should be constructed since there is no provision for sludge (centrifuge) storage at the site.
7. Chlorine contact tanks shall be thoroughly cleaned, tiled, and painted with algae-resistant paint or coating, preferably in blue color
8. Restoration of plant roads and drains in complete to original condition.
9. Dismantling and demolition of existing of sludge drying beds and leveling to FGL.
10. Removing and fixing of new doors, windows, ventilators and finishing work in all respect as per contract specification as defined elsewhere in the contract document.
11. Cleaning of existing wet well and finishing work for existing raw sewage pump house shall be carried out as per the directions of Engineer-In-Charge.
12. Automatic gate shall be provided at the entrance of Rajacanal STP as per the direction of Engineer-In-Charge.

1.6 Treated Effluent and Sludge Characteristics

The treated effluent characteristic for the STP shall comply with the following discharge standards given in the Table below:

Parameters	Unit	Value
Treated Effluent Discharge		
pH - Instantaneous range		6.5 – 8
BOD_5 at 20^0C- Maximum monthly average	mg/L	< 10
COD - Maximum monthly average	mg/L	< 50
TSS - Maximum monthly average	mg/L	< 10
Total Nitrogen - Maximum monthly average	mg/L	< 10
Alkalinity - Minimum instantaneous	mg/L as $CaCO_3$	~ 70
Total Phosphorus - Maximum monthly average	mg/L	< 1
Residual Chlorine - Instantaneous	mg/L	$\leq$ 1
Faecal Coli-form - Maximum monthly average	MPN/100 mL (Allowable)	$\leq$100
Sludge for Disposal		

Parameters	Unit	Value
Maximum VSS/TSS ratio	%	75%
Solid Concentration in Dewatered Sludge	%	4-5%
Grit for Disposal		
Organic Content in Grit	%	< 10 %

1.7 Site Conditions

The Plant shall be designed and constructed taking into account the following.

Location	:	Amani Byrathikane Village upstream to Kalkere Lake.
Annual Average Ambient Temperature	:	24º C (Ranges from 13°C in the winter to 36°C in the summer)
Average Annual Rainfall	:	900 mm
Relative Humidity (maximum)	:	75%
Longitude	:	13° 04’ North
Latitude	:	77° 65’ East
Average Altitude	:	RL 839 to RL 962 m above Mean Sea Level (MSL).
Site Conditions	:	Tropical
Total Area	:	22 Acres (out of which Rajacanal Phase-I plant occupied an area of about 9.6acres)

The plant shall be designed to suit the ambient temperature mentioned above with the Contractor making due allowance in his designs for the increased temperatures experienced by Plant exposed to direct sunlight.

1.8 Minimum Design Life

The Plant components shall be designed and constructed to provide the minimum service life listed below for each component.

Reinforced Concrete Structures	:	60Years
Buried Piping	:	60 Years
Other Civil Structures	:	50 Years
Steel Structures	:	50 Years
Buried Earth Electrode System	:	40 Years
Mechanical Equipment	:	20 Years
Electrical Equipment	:	15 Years
Control Panels	:	15 Years
Instrumentation Systems	:	10 Years
Diffusers	:	7 Years
Computer System	:	7 Years
All type of Server and Computer based Software’s	:	Should be updated to latest version

1.9 Survey and Geotechnical Data and other tests

The Employer has the following data available and used these in formulation of the tender elements. They are listed below and shall be used only as guideline. Any use of this report or information contained therein shall be solely at the Contractor's own risk. The Employer accepts no responsibility whatsoever for, nor guarantee, the accuracy, applicability, or completeness of the Report or information contained therein.

Tenderer may carry out the topographical survey, alignment survey, geotechnical investigation and all other details necessary for proper formulation of his price proposal before submission of tender.After award of contract, Contractor shall carry out independently fresh survey, geotechnical investigation, sewage quality analysis and all other details necessary for proper planning and detailed design. The Contractor will be required to provide full details of the survey and geotechnical investigations for site for the approval of the Employer.

1.10 Access for Other Contractors

The Contractor shall allow reasonable access to other Contractors engaged on the Site or on areas adjoining the Site to carry out their work.In the event of a dispute over access or priority between Contractors, the Engineer shall be informed in writing. The Engineer shall inform all parties concerned in writing of his decision.

Where any part of the Works is associated with or in physical contact with plant supplied under a separate contract, the Contractor shall satisfy himself that the work carried out by the other Contractor is consistent with the correct operation of the Plant. In the event of the Contractor considering any work being carried out or any work already completed to be detrimental to the ultimate operation of the Plant, he shall report the matter to the Engineer.

If the work of the Contractor is delayed because of any acts or omissions of any other contractor, the Contractor shall have no claim against the Employer on that account other than for an extension of time.

1.11 Interface with Other Contracts

The Works under this Contract will physically interface with Works under the respective other contracts. The Contractor of this contract shall co-ordinate with Employer and the Contractor of other contracts as applicable and ensure that all interfaces are designed, constructed, installed, tested, commissioned, operated, and maintained properly to provide a fully functional system meeting all applicable performance requirements.

Available interface information for STP and ISPS is provided in Volume 2, Section 7, Part 5. However, neither the Employer nor the Engineer makes any representation regarding the validity, accuracy, adequacy, or completeness of this information. The Contractor of this contract shall be fully responsible for independently field-verifying any and all information he considers relevant in order to provide a fully functional system.

1.12 Contractor's Bengaluru Site Office

The contractor shall provide general information on the management structure of the design and construction team, and shall make provision for suitably qualified personnel to fill the key positions listed below. The contractor must have qualified employed personnel to fill the following minimum positions. The contractor shall supply information, of the personnel with relevant experience, on a prime experience requirements specified below: candidate and on an alternate for each position; both of whom shall meet the minimum experience requirements specified below: The minimum Design Staff assigned to the Site Office shall be as per Table below and the Office shall include sufficient administrative staff to support the office.

Sl. No.	Position	No. of Position	Minimum Education (Degree Discipline)	Experience (years)		
				Total	In Similar works	As Manager of Similar Works
1	Project/Construction Manager	1	M-ENE / Structures	15	8	5
2	Design Manager	1	M- ENE	15	8	5
3	Asst. Construction Manager- Multidisciplinary works	3	BE - Civil	10	6	2
4	Accident Prevention Officer/ Safety officer	1	B-any discipline PGD -ISM	10	2	N/A
5	Senior Surveyor	1	B-S/CE	5	3	N/A
6	Process Engineer	1	MNE or CHE	10	6	N/A
7	Mechanical Engineer	2	M – Mechanical Engineering / Design	10	2	NA
8	Hydraulic Engineer	1	B-CE	10	3	N/A
9	Structural Engineer	1	M- Structures	10	6	NA
10	Electrical Engineer	1	B-Elec	10	2	NA
11	Instrumentation Engineer	1	B-IE	10	3	NA
12	Plant Manager O &M	1	B-ENE	10	5	3

NA: Not applicable. Degree: M = Masters; B = Bachelors; PGD= Post Graduate Diploma; ISM= Industrial Safety Management Discipline: E = General Engineering; CE = Civil Engineering; CHE = Chemical Engineering; ME = Mechanical Engineering; EE = Electrical Engineering; ENE = Environmental Engineering; IE = Instrumentation Engineering; S = Surveying; PHE = Public Health Engineering; SE = Sanitary Engineering. The requisite information shall be furnished as per Application Forms.

Contractor shall designate a Design Manager who is responsible for the complete Works design including preparation of Detailed Designs and obtaining all required Detailed Design approvals. The Contractor shall also designate Design Leads for each design discipline required. The Contractor shall

mobilize the entire Design Team to Office in Bengaluru. This design team shall work in coordination with Construction team at Site.

The Design team shall be staffed to facilitate and expedite submittals of Detailed Designs. Contractor shall designate Design Manager who reports directly to the Contractor's Project Manager and will be stationed full-time in the Bengaluru Office through the Detailed Design preparation, submittal and approvals. Contractor shall also designate Design Leads for each design discipline required stationed in the Bengaluru Office who will do design production. The Design Manager will communicate directly with Employer's staff and its designees throughout Detailed Design preparation, submittal, review and approval, as well as during the same procedures for submittals for testing and commissioning and all other design related submittal required in accordance with the Contract. The Office Staff in conjunction with the Contractor's Home office staff will be responsible for timely response to Employer's comments related to the Detailed Design.

The Contractor's Project Manager will be responsible for the efficient coordination of the Office, Home Office and Employer's staff & its designees such that the design work proceeds expeditiously.

The Contractor shall operate and maintain its Office throughout the Detailed Design preparation, submittal and approval process. Approval of the Detailed Design shall be determined when all submittals have received a review designation of "A-Approved" and final copies of all Detailed Designs have been submitted. Further contractor shall also submit as built drawings for approval after all designs and drawings are approved in code A.

End of Part 1